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PROJECT SURVEILLANCE SERVICES AND AIR MONITORING DURING REMOVAL OF
ASBESTOS-CONTAINING MATERIAL QUARTER 759 CNC CHARLESTON SC
10/1/2000
BAT ASSOCIATES, INC.

**Project Surveillance Services and Air Monitoring
During Removal of Asbestos-Containing Material
at the
North Charleston Naval Base: Quarter 759
North Charleston, South Carolina**

Contract Number: N62467-96-R-0098

Prepared for:

Department of the Navy
Southern Division
NAVFACENGCOM
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DO-0015

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EXECUTIVE SUMMARY

BAT Associates, Inc. (BAT) was retained by the Department of the Navy Southern Division NAVFACENGCOCM (SouthDiv.) to perform project surveillance and air monitoring services before, during, and after the removal of asbestos-containing materials (ACM) at the North Charleston Naval Base. Project activities were centered around Quarter 759 (hereinafter referred to as the Project Site). Work scheduled at the Project Site included the area above the ceiling of a residential mechanical room and the mechanical room.

Cape Environmental Management Inc. (Abatement Contractor) was retained by SouthDiv to perform the asbestos removal, disposal, and clean-up at the Project Site. Mr. Foshie Bell, Project Industrial Hygienist, performed on-site project surveillance and air monitoring for BAT and the Navy. The Contractor was represented by Mr. Mayro Hidalgo, Project Supervisor.

The following paragraphs summarize the information in the report.

1. Project activities began on September 6, 2000 and were completed on September 8, 2000. The scope of work for abatement included the removal of asbestos-containing thermal system insulation (TSI) mudded fittings from domestic water pipes and steam pipes; asbestos-containing drywall; and asbestos-containing thermal gaskets.
2. BAT performed on-site fiber counting air monitoring and analysis using Phase Contrast Microscopy (PCM). All sample collection and fiber counting were executed in accordance to the National Institute of Occupational Safety and Health (NIOSH) 7400 Method.

Fifteen air samples were collected during the course of the project. Air samples included background samples, work area samples (inside the work containment), critical area samples (outside the work area samples), and final clearance air samples (Appendix A).

BAT collected five final clearance air samples (including field blanks) and evaluated the air samples using PCM. All final clearance air samples indicated airborne fiber concentrations of less than 0.010 fibers per cubic centimeter of air (<0.010 f/cc). All work areas successfully met "release criteria", which included a final visual inspection and final clearance air testing, and all are ready for re-occupation.

1.0 PURPOSE

The purpose for the asbestos abatement activities was to: 1) remove and properly dispose of previously identified friable and non-friable ACM in and above the mechanical room of the work area, and 2) properly clean the work area prior to an anticipated property transfer. SouthDiv initiated an asbestos remediation program to accomplish the aforementioned goals.

1.1 BACKGROUND INFORMATION

A previously performed asbestos survey of the Project Site identified: 1) asbestos-containing mud on pipe joints of domestic water lines and steam valves; 2) asbestos-containing pipe insulation along the same pipes; 3) asbestos-containing drywall material; and 4) asbestos-containing thermal gaskets associated with an inoperative boiler.

1.2 SEQUENCE OF WORK

The sections 1.2.1 through 1.2.6 describe the activities executed by the Contractor during the asbestos abatement and BAT's project surveillance activities. Section 2.0 describes activities performed by BAT while conducting air monitoring tasks.

1.2.1 Work Area Isolation

The Contractor performed the following actions to ensure isolation of the work area in accordance with regulatory requirements. Proper warning signs were posted at the entrance of the regulated areas (work areas) to prevent entry by unauthorized persons (refer to Appendix B: Photographic Documentation Photo 1). The work areas were isolated from the unprotected public by separation and usage of temporary critical barriers over doorways, and/or other openings. Temporary critical barriers were constructed of 6 millimeter thick (6-mil) polyethylene sheeting and installed using spray glue and duct tape (Photo 2).

A personal decontamination facility (PDF) was constructed and used by the Contractor's workers and other work area visitors to dispose of used coveralls and rinse themselves of any dust or debris prior to leaving the clean side of the PDF. The PDF was located at the entrance to the work area and consisted of three primary chambers: 1) dirty room, 2) decontamination shower, and 3) clean room. Each chamber of the PDF was segmented via overlapping curtains constructed of 6 mil polyethylene sheeting.

An equipment decontamination enclosure (EDF) was constructed and used by the Contractor's workers to rinse equipment of any dust or debris prior to leaving the clean side of the EDF. The EDF was located at the entrance of the work area and consisted of: 1) dirty room, 2) decontamination shower, and 3) clean room. The EDF chambers were segmented via overlapping curtains constructed of 6 mil polyethylene sheeting.

1.2.2 Asbestos Removal Procedures

The Contractor used wet removal methods as the primary engineering control during the removal, disposal, and cleaning process of the asbestos-containing and asbestos-contaminated materials. The Contractor wetted the materials with an amended water solution before initiating removal and continued wetting the materials throughout the removal process. Other engineering controls used to supplement the wet removal methods included the use of negative pressure differential machines. Negative pressure differential machines extracted potentially contaminated air from the work area, filtered the air using High Efficiency Particulate Absolute (HEPA) filters, and exhausted the filtered air to the outside environment. These machines were located throughout the work areas.

During the removal activities, BAT systematically monitored the filtered exhaust from the negative pressure differential machines for asbestos fiber concentrations. BAT collected air samples representative of the filtered exhaust and evaluated samples via fiber counting (see Section 2.0). All samples indicated that the filtered exhaust were lower than the airborne fiber concentration required to meet release criteria (0.010 f/cc).

Gross Removal of Friable Asbestos-Containing TSI

The Contractor's workers donned full-face powered air purifying respirators (P.A.P.R.) during the gross removal of asbestos-containing TSI. Other personal protective equipment (PPE) included hooded disposable coveralls with booties, protective footwear, eye-wear, and gloves. The Contractor's personnel down-graded to half-face negative pressure air purifying respirators (A.P.R.), during the final cleaning process.

Removal of asbestos-containing TSI included mudded pipe fittings on domestic water lines and valves on steam pipes. The Contractor's workers utilized hand-held tools during removal, which included utility knives, scrapers, and wire brushes. After removal, workers promptly containerized the removed materials into properly labeled 6 mil. asbestos disposal bags. All disposed materials were double bagged and sealed prior to removal from the work site. Materials were kept in a wetted state prior to placement in disposal bags.

Removal of Asbestos-Containing Drywall

Prior to the removal of contaminated drywall material, the Contractor wetted the material to the point of saturation. The Contractor then removed the drywall panels from their wooden substrate while still in the saturated state. Upon removal, the Contractor promptly containerized the targeted material into properly labeled 6-mil asbestos disposal bags. The Contractor used scrapers and wire brushes to clean the wooden substrate of any residual debris

Removal of Asbestos-Containing Thermal Gasket Material

The Contractor's scope-of-work included removal of several asbestos-containing thermal gaskets associated with an inactive boiler in Quarter 759 mechanical room. Using 3-in-1 tools and wire brushes the Contractor removed the asbestos-containing gaskets and disposed of the materials into properly labeled 6-mil asbestos disposal bags. Boiler areas subjected to the abatement were then wire brushed and wet wiped clean.

1.2.3 Disposal of Contaminated Liquid

Asbestos-contaminated run-off and residual water, resulting from personnel and equipment decontamination was handled in accordance with regulatory requirements. The Contractor collected all water used throughout the removal and decontamination process in the showers of the PDF. Water was filtered through the Contractor's 3-filter shower filtration unit. The effluent was then passed through a 10-micron, 5-micron, and 3-micron filtering system. After filtration, the water was discharged into the public sewage system as filtered effluent.

1.2.4 Site Visitation

During the removal and clean-up activities, no site visitation from SouthDiv or any regulatory agencies were observed. Periodic site visitations from the Re-Development Authority (RDA), engaged in unrelated tasks, were observed.

1.2.5 Pre-Abatement and Final Visual Inspection

BAT performed pre-abatement visual inspections of each work area prior to the start of

asbestos removal activities. Final visual inspections were performed by the BAT specialist upon completion of asbestos removal and detailed cleaning. Mr. Foshie Bell, an accredited Inspector in accordance with Asbestos Hazard Emergency Response Act (AHERA), performed the visual inspections. Mr. Bell's certification number is 2900.

The pre-abatement visual inspections were performed by Mr. Bell and Mr. Mayro Hidalgo (Abatement Contractor's Site Supervisor) upon completion of work area preparations. During the visual evaluations, the negative pressure differential machines, PDF showers, and EDF showers were functioning properly. No breaches in the critical barriers were observed.

BAT performed a final visual inspection at the completion of the asbestos removal and work area clean-up. Mr. Bell performed the final visual inspection of all work area in conformance with practices and procedures in the Navy's Scope-of-Work and Third Party Monitoring specification. The visual inspection included, but not limited to, a visual review of horizontal and vertical surfaces for visible accumulation of asbestos dust and/or asbestos-contaminated debris. The Contractor promptly cleaned areas of visible residual dust and/or debris identified by BAT during the inspection.

Results of the final visual inspection did not identify visible accumulations of asbestos-containing or contaminated dust or debris. In preparation for final clearance air testing, the Contractor encapsulated abated surfaces within the work areas with a penetrating encapsulant to lock-down unseen fibers.

1.2.6 Post-Abatement Inspection

BAT performed post-abatement visual inspections with the Contractor in the work areas. Locations identified to contain residual ACM after the removal of critical barriers (normally behind duct tape) were HEPA vacuumed and wet wiped until visually clean. Additionally, BAT conducted area air sampling during the dismantling of the work area barriers (tear-down). Fiber counting results from these activities indicated airborne fiber concentrations of <0.010 f/cc for the duration of the tear-down.

2.0 AIR SAMPLE COLLECTION

BAT collected daily air samples from outside the work area, inside the work area, and at the exhaust points of negative pressure differential machines. Air samples were collected on 25 millimeter, 0.8 micron pore size mixed cellulose ester filter cassettes with 50 millimeter, non-conductive cowls. Air samples were collected at an approximate flow rate of 0.5 liters per minute (LPM) to 16.0 LPM, as per NIOSH 7400 Method. The sampling pumps were calibrated before and after each sampling period using a high volume Rotometer calibrated using a primary calibration standard.

Air samples were fiber counted using Phase Contrast Microscopy (PCM) by Mr. Bell. Mr. Bell has successfully completed the National Institute for Occupational Safety and Health (NIOSH) 582 course, *Sampling and Evaluating Airborne Asbestos Dust*, and has successfully participated in the Proficiency Analytical Testing (PAT) program.

2.1 Daily Air Samples

Airborne fiber concentrations at critical barriers and at negative pressure differential exhaust points did not exceed 0.010 f/cc of air during the removal or cleaning process. Although there are no Federal or state regulations governing the concentration of airborne fibers inside work areas, it is noteworthy that during removal activities airborne fiber concentrations, on average, were maintained at or below final clearance thresholds. An airborne fiber concentration of 0.010 f/cc (by PCM) is the EPA-recommended re-occupancy concentration following an asbestos response action. The Occupational Safety and Health Administration (OSHA) instructs that a concentration of 0.100 f/cc is a permissible exposure to airborne asbestos for an 8-hour time weighted average. Photocopies of the Fiber Counting reports are included in Appendix A: *PCM- Fiber Counting Results*.

2.2 Final Clearance Air Testing

After the abatement work was completed and prior to collecting final clearance air samples, the negative air pressure differential machines, equipped with HEPA filters, were used to evacuate any residual airborne fibers, and to reduce the moisture in the work area.

An "aggressive" final clearance air testing protocol was used, that consisted of agitating the air in each work area with an electrically operated, one-horse power leaf blower. Aggressive air sample collection techniques create a worst-case-scenario from which clearance samples were collected.

BAT collected five final clearance air samples at the Project Site using high volume pumps and PCM air filter cassettes. Filters were fiber counted via PCM. All samples indicated airborne fiber concentrations less than 0.010 f/cc.

3.0 DATA EVALUATION

All critical barriers, work areas, and negative pressure differential exhaust point air sample fiber concentrations were less than 0.010 f/cc of air. An airborne fiber concentration of 0.010 f/cc, is the EPA recommended airborne fiber concentration level for re-occupancy. No residual dust or debris was noted upon completion of the final visual inspections. Final clearance air samples indicated airborne fiber concentrations of

less than the EPA re-occupancy standard of 0.010 f/cc.

4.0 CONCLUSION

Based on BAT's field observations, visual inspection, and fiber counting results, the asbestos abatement activities have been performed in conformance to the project work plan and applicable Federal and state regulations. With the conclusion of removal and cleaning activities, BAT informed SouthDiv of the successful final clearance air results and announced the availability to re-occupy the Project Site.

5.0 LIMITATIONS

The conclusions presented in this report are based on: 1) visual observations performed during and after asbestos removal and final cleaning; 2) the results of fiber counting of collected air samples; and 3) the results of final clearance air samples evaluated via PCM. Airborne fiber concentrations will vary between sample locations. BAT's assessment of the performance of the work performed by the Contractor is a professional opinion, arrived at through the methods and procedures accepted by the industry. No warranty is expressed or implied.

This report has been prepared on behalf of the Southern Division of the Navy and their authorized affiliates. Should any other person, partnership, or corporation desire to rely upon this report, it will be necessary for BAT Associates, Inc., to update it for the new user.

APPENDIX A

PCM - Fiber Counting Results

Sample ID	Sample Location	Volume (L)	MFC (f/cc)	LOD (f/cc)	LOQ (f/cc)	RFC (f/cc)
971001-01	BG: Above ceiling	3,000.0	0.001	0.001	0.010	0.001
971001-02	BG: In mechanical room	3,000.0	0.001	0.001	0.010	0.001
971001-03	BG: In mechanical room	3,000.0	0.002	0.001	0.010	0.002
971001-04	IWA: Above ceiling of mechanical room	360.0	0.055	0.006	0.086	0.055
971001-05	IWA: In mechanical room	360.0	0.040	0.006	0.086	0.040
971001-06	OWA: Clean Room	2,700.0	0.002	0.001	0.011	0.002
971001-07	OWA: Negative air machine exhaust	2,700.0	0.001	0.001	0.011	0.001
971001-08	Field Blank (Laboratory)	N/A	N/A	N/A	N/A	0.0 f/mm ²
971001-09	Field Blank (30 second)	N/A	N/A	N/A	N/A	0.0 f/mm ²
971001-10	FC: Dirty room	3,000.0	0.001	0.001	0.010	< 0.010
971001-11	FC: Mechanical room	3,000.0	0.001	0.001	0.010	< 0.010
971001-12	FC: Above ceiling	3,000.0	0.001	0.001	0.010	< 0.010
971001-13	Field Blank (Laboratory)	N/A	N/A	N/A	N/A	0.0 f/mm ²
971001-14	Field Blank (30 second)	N/A	N/A	N/A	N/A	0.0 f/mm ²

Legend

BG – Background
MFC – Measured Fiber Concentration
RFC – Reported Fiber Concentration

OWA – Outside Work Area
LOD – Limit of Detection
FC – Final Clearance

IWA – Inside Work Area
LOQ – Limit of Quantification

APPENDIX B

Photographic Documentation



PHOTO 1: View of the Project Site. Note the barrier tape encompassing the work site, and the warning sign tape to the tape. The garage shown was used to assess the work area.



PHOTO 2: View of the PDF and a negative pressure differential machine. Note the warning sign at the entrance of the clean room chamber. The decontamination shower and dirty room are shown as well.



PHOTO 3: View of the ceiling access door that leads to the area above the mechanical room. Refer to Photos 4 and 5 for views above the ceiling.



PHOTO 4: View of pre-existing site conditions above the ceiling prior to removal activities.

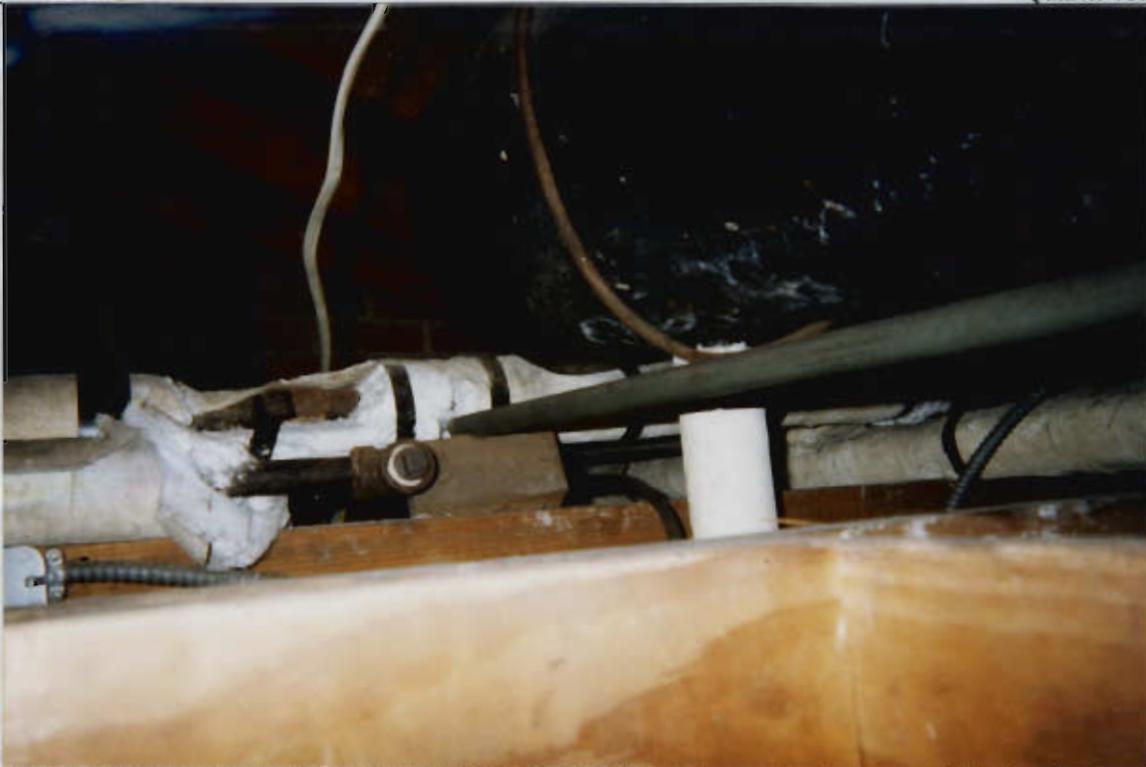


PHOTO 5: View of pre-existing conditions above the ceiling of the mechanical room. Note the damage of the ACM. Note the residual debris identified on the wooden substrates.



PHOTO 6: View of the asbestos-containing drywall board identified in the mechanical room.



PHOTO 7: View of the inoperable boiler with the associated asbestos-containing thermal gaskets.



PHOTO 8: View of the Contractor's worker fine cleaning the areas where the asbestos-containing gaskets were located.



PHOTO 9: View of the boiler after the removal of the asbestos-containing gaskets and cleaning.

APPENDIX C

Professional Certification



ASBESTOS ABATEMENT LICENSE

No. 23049

This certifies that

Foshie Bell

149-AP-0385

doing business as *B A T Associates, Inc.*

has satisfactorily completed the training required by South Carolina Regulation No. 61-86.1 for the category of

Air Sampler

The holder of this license shall comply with all the requirements of said Regulation.



This License, License Number, or any Representation thereof, is not transferable to any other licensee or company. Use of this License is only authorized for the licensee and Company whose name appears hereon and shall expire one year from 11/15/99.

04/17/00

Richard D. Sharpe

Richard D. Sharpe, Director
Air Compliance Management Division
Bureau of Air Quality
South Carolina Department of Health & Environmental Control

04/17/00 15:34



ORIGINAL

CR-001126



ASBESTOS ABATEMENT LICENSE

No. 46199

This certifies that

Foshie Bell

149-AP-0385

doing business as *B A T Associates, Inc.*

has satisfactorily completed the training required by South Carolina Regulation No. 61-86.1 and the EPA Model Accreditation Plan, 40 CFR 763 Subpart E Appendix C, for the category of

Supervisor

The holder of this license shall comply with all the requirements of said Regulation. This license allows the holder to perform abatement activities involving RACM that is in or on interior structural components or other parts of a regulated facility with the exception of RACM subject to the requirements of Section XI of SC DHEC Regulation No. 61-86.1.

This License, License Number, or any Representation thereof, is not transferable to any other licensee or company. Use of this License is only authorized for the licensee and Company whose name appears hereon and shall expire one year from 11/15/99.

Hazard Emergency Response Act of 1986 (AHERA) to perform as an abatement worker. The holder of this license is qualified in accordance with requirements of the Asbestos



04/17/00

Richard D. Sharpe

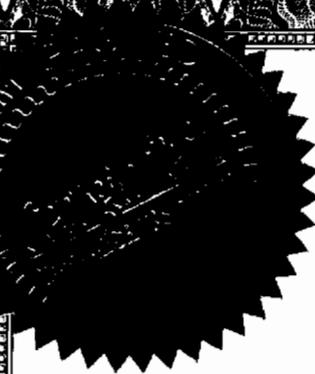
Richard D. Sharpe, Director
Air Compliance Management Division
Bureau of Air Quality
South Carolina Department of Health & Environmental Control

04/17/00 15:36



ORIGINAL

CR-001126



Georgia Institute of Technology

This is to certify that

Foshie Bell

has attended an EPA-approved one-day Continuing Education Course entitled:

***Advanced Supervision of Asbestos Abatement Projects
(Annual Refresher Course for Abatement Contractors and Supervisors)***

as required by the Federal EPA AHERA Model Accreditation Plan (TSCA Title II) and NESHAP requirements for re-accreditation as an Asbestos Abatement Project Contractor and/or Supervisor.

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November 15, 1999

Date of Attendance

November 15, 2000

Expiration Date

149-64-0385

Social Security Number

Vicki Ainslie

Vicki Hanrahan Ainslie
Course Director

5284

Certificate Number

GEO-ENVIRONMENTAL SERVICES, INC.

FOSHIE R. BELL JR. IV.

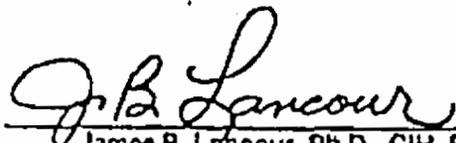
Has Completed and Satisfactorily Passed An Examination For

**"SAMPLING AND EVALUATING AIRBORNE
ASBESTOS DUST - NIOSH 582"**

Conducted by

Geo-Environmental Services, Inc.

Atlanta, Georgia, January 9, 1990


James B. Lancour, Ph.D., CIH, PE
Course Director


Kenneth M. Smith
Course Coordinator